The 2012-2013 Hydrometeorology Testbed Numerical Weather Prediction Suite

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A Numerical Weather Prediction (NWP) suite has been constructed to support the activities of the NOAA Hydrometeorology Testbed (HMT) along the west coast of the United States (HMT-West) for the 2012-2013 cool season. The primary mission of HMT is to conduct research on high-impact precipitation events and weather conditions that can lead to flooding, fostering transition of scientific advances and new tools into operations. The HMT NWP suite provides guidance to forecasters and serves as a tool for research, which is conducted by forecast evaluation and comparison against existing operational models.

The HMT NWP has two main components, both utilizing the Advanced Research core of the Weather Research and Forecasting (WRF) model. The first component of the HMT NWP suite is a deterministic, 3-km grid spacing configuration that is initialized hourly using analyzed fields from the Local Analysis and Prediction System (LAPS) and focuses on the west coast. Forecasts are produced hourly out to 12 hours with the main purpose of providing input to the HMT "flux tool", a forecast product that combines wind observations aloft with vertically integrated water vapor to estimate the bulk transport of water vapor. The second component is a North American eight-member ensemble run with 9-km grid spacing, initialized four times a day and run out to 84 h at 00z and 12-h at 06, 12 and 18Z. This component was designed to provide quantitative precipitation forecasts (QPF) to the NWS West Coast Weather Forecast Offices. The ensemble uses a variety of initial conditions from LAPS and the Global Forecasting System (GFS) and multiple boundary conditions from the GFS ensemble. Additionally, a diversity of physical parameterizations is used to increase ensemble spread and to account for the uncertainty in forecasting extreme precipitation events.

In this presentation we will describe the end-to-end NWP suite, covering aspects of the data assimilation procedure to make use of local observations, the model configuration, and the generated products, including forecast verification.